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The Socio-Economic Impact of the Disproportionate Occurrence of Asthma in the State of Mississippi: Should Reporting be Mandated?

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Cover Page Footnote

1 Poverty status is determined by comparing annual income to a set of dollar values called poverty thresholds that vary by family size, number of children, and age of householder. This information was taken from the 2011 United States Census Bureau, <http://www.census.gov/prod/2011pubs/acsbr10-01.pdf>. (accessed March 14, 2018). 2 Environmental Health, "Maryland Health Improvement Plan, 2000-2010.

The Socio-Economic Impact of the Disproportionate Occurrence of Asthma in the State of Mississippi: Should Reporting be Mandated?

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ABSTRACT

The state of Mississippi continues to experience a disproportionate occurrence of asthma among its citizens and various associated socioeconomic impacts. The objective of this study seeks to gauge the perception of the participants in regards to this asthma disparity. Specifically, research questions seek responses to following: 1) Will mandated, systematic reporting of asthma occurrences among socioeconomically disadvantaged communities effectively address the asthma disparity and lead to a better quality of life? and 2) Will mandated, systematic reporting of asthma increase the socioeconomic impact among these communities? This cross-sectional study employs a case study methodology utilizing various research techniques, i.e. interviews, surveys, and statistical data reports. Overall, for each question presented, the participants' responses indicate, significantly and positively, 1) Mandated, systematic reporting of asthma reporting should be implemented, and 2) This mandate can lead to a decrease in asthma disparity and result in a better quality of life among these communities.

Key Words: Asthma, Asthma Disparity, Health Disparity, Public Policy, Chronic Illness

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INTRODUCTION

As reported by the Center for Disease Control and Prevention (CDC), an estimated 39.5 million people (12.9%), including 10.5 million (14.0%) children in the United States had been diagnosed with asthma in their lifetimes. Of the 39.5 million, 18.9 million (8.2%) adults and 7.1 million (9.5%) children still have asthma. The estimated total cost of asthma to society, including medical expenses (\$50.1 billion per year), loss of productivity resulting from missed school or work days (\$3.8 billion per year), and premature death (\$2.1 billion per year), was \$56 billion in 2007.

According to the 2017 U.S. Census Bureau report, “*Individuals Below Poverty Level by State*,” individuals in the state of Mississippi that are living below the poverty level is 20.8%, which positions Mississippi as the state that has the highest number of individuals living below the poverty level of all states within the U.S., with the exception of Puerto Rico. (U.S. Census, 2018). Also, the Mississippi State Department of Health (MSDH), reports that 8.7% of Mississippi children and 7.6% of Mississippi adults had asthma in 2011. (MSDH, 2016). The epidemic of asthma has become one of the most critical public health threats for Mississippi and the impact is felt in many different ways, i.e. health care costs associated with treatment and medication, long-term management, and indirect cost incurred by time lost from school and work that affects the economic future of the state, as well as, the financial and emotional impact on patients and their families. (Mississippi State Asthma Plan, 2016) Other pertinent facts regarding the state of Mississippi are presented here:

2017 State of Mississippi Facts

Population	2, 984, 100
Median Income	40, 528
Male	27, 228
Female	17, 638
Persons without Health Insurance	14.6%

Source: U.S. Census Bureau (2018)

Cost of Asthma in Mississippi

In 2011, an estimated 169,009 (7.6%) adults and 66,253 (8.7%) children had asthma in Mississippi. In the United States, the 2007 annual direct health care cost of asthma was approximately \$50.1 billion; indirect costs (e.g. lost productivity) added another \$5.9 billion, for a total of \$56.0 billion. In 2007, the total health care cost of asthma in Mississippi was nearly \$770.0 million. In 2011, there were 1,829 hospital stays and 14,141 ED visits for asthma in Mississippi. In 2011, there were 1,829 asthma hospitalizations in Mississippi. Public insurance

programs such as Medicare and Medicaid covered 66.0% (n=1,212) of those hospital stays. The total estimated cost for Medicaid: \$6.7 million; Medicare: \$8.1 million; Insurance: \$5.0 million; Self-Pay: \$1.3 million and Other: \$1.6 million. In 2011, there were 14,141 asthma ED visits in Mississippi. Public insurance programs such as Medicare and Medicaid covered 54.0% (n=7,610) of the ED visits. The total estimated cost for Medicaid: \$20.4 million; Medicare: \$17.8 million; Insurance: \$13.0 million; Self-Pay: \$7.0 million and Other: \$4.7 million (MSDH, 2018). Based upon these data, this author asserts that mandated, systematic reporting of asthma can: decrease the cost of asthma within the state of Mississippi by identifying and addressing the illness in early stages and providing treatment that can result in better management of the illness.

According to a study conducted by Brugge and Hyde, there is an economic benefit in the managed care of asthma. Based upon their findings, cost-effectiveness analyses on educational interventions suggest that reductions in direct costs are most prominently seen for severe asthma, with the interpretation of study findings impaired by a lack of methodological consistency. One analysis from a study that included physical interventions found that the incremental cost-effectiveness ratio was \$US9.20 per symptom-free day (95% CI -\$US12.56, \$US55.29), with potential cost savings for more severe asthma. (Brugge & Hyde, 2004).

Asthma Disparity Within the state of Mississippi

Healthy People 2020 defines a health disparity as “a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion.” (MSDH, 2018)

The purpose of this article is to identify the asthma disparity within the state of Mississippi and to illustrate its socio-economic impact upon this state. As previously state, the author will utilize data and statistics from the Center for Disease Control and Prevention (CDC) and the Environmental Protection Agency (EPA) to support this study. Table 2 illustrates the percentage of occurrences of asthma, based on race and sex, as well as, the corresponding death rate for asthma in the state of Mississippi.

Table 2: Asthma Statistics in the State of Mississippi

<u>State</u>	<u>% of asthma occurrences</u>	<u>Death Rate (Per Million)</u>
MS	8.2	19.8
Adult Black Males	6.9	
Adult Black Females	10.1	
Adult White Males	4.4	
Adult White Females	9.6 (CDC, 2013)	

In 2011, the Mississippi State Department of Health reported that 8.7% of Mississippi children and 7.6% of Mississippi adults had asthma. However, the proportion of people with asthma was not equally distributed among different subgroups. The prevalence of asthma among boys ages 0-17 is significantly higher among blacks (14.1%) compared to whites (5.8%). In girls ages 0-17, the prevalence of asthma is significantly higher among blacks (10.6%) compared to

whites (6.8%). In 2011, the prevalence of current asthma among boys is 9.4% compared to girls 8.1%. Among adult males the prevalence of asthma for blacks is 6.9% compared to 4.4% for whites. Among adult females the prevalence of asthma for blacks is 10.1% compared to 9.4% for whites. Notably, the prevalence of asthma among adult females (9.6%) is significantly higher than adult males (5.5%). (Mississippi Asthma Data, 2015)

The Socio-Economic Disparities in Asthma Burden in Mississippi

Asthma burden was higher among poor Mississippians. In 2011, 10.7 % of adults living in households with annual income less than \$25,000 had asthma, compared to 5.6% of adults living in households with annual income from \$25,000 to \$49,000, 4.2% of adults living in households with annual income of more than \$50,000. (MSDH, 2018).

Should There be Mandated Reporting of Asthma Occurrences?

In the state of Mississippi, asthma is not considered a “notifiable infectious or reportable disease.” As defined by the CDC, a notifiable infectious disease or condition is one for which regular, frequent, and timely information regarding individual cases is considered necessary for the prevention and control of the disease or condition. As such, there is no mandated, systematic tracking of asthma occurrences. In the past, several life-threatening diseases, including measles, tuberculosis, and HIV/AIDS, at one time, were not reportable diseases. However, due to the communicability and number of deaths caused by these diseases, they now require mandated reporting and the number of occurrences have extensively decreased, according to the CDC and county health departments. For example, mandatory notification of HIV has resulted in an increase in detection of newly diagnosed infections, reduced the levels of missing data and has provided a more realistic picture of the epidemiology of HIV. This information also helps to improve the suitability of interventions aimed at HIV prevention and control. (Reyes-Urueña, García de Olalla et al., 2013). Giving these results, should reporting of asthma occurrences be mandated? Will this assist in reducing emergency room visits, hospitalization, loss of productivity, reduce number of days absent from work, and number of deaths due to asthma? According to the evidence submitted, we can answer in the affirmative.

As reported by the Mississippi State Department of Health, Mississippi four classifications of reportable diseases, identified as follows:

Class 1

Diseases of major public health importance which shall be reported directly to the Mississippi State Department of Health (MSDH) by telephone within 24 hours of first knowledge or suspicion. Class 1 diseases and conditions are dictated by requiring an immediate public health response. Laboratory directors have an obligation to report laboratory findings for selected diseases. Any Suspected Outbreak (including foodborne and waterborne outbreaks) i.e. HIV/AIDS, Rubella, Yellow Fever, and Syphilis

Class 2

Diseases or conditions of public health importance of which individual cases shall be reported by mail, telephone, fax or electronically, within 1 week of diagnosis. In outbreaks or other unusual circumstances, they shall be reported the same as Class 1. Class 2 diseases and conditions are those for which an immediate public health response is not needed for individual cases, i.e. Malaria, Tetanus, and Rubella

Class 3

Laboratory based surveillance. To be reported by laboratories only. Diseases or conditions of public health importance of which individual laboratory findings shall be reported by mail, telephone, fax or electronically within one week of completion of laboratory tests. i.e. all blood lead tests and Hepatitis C infection

Class 4

Diseases of public health importance for which immediate reporting is not necessary for surveillance or control efforts. Diseases and conditions in this category shall be reported to the Mississippi Cancer Registry within six months of the date of first contact for the reportable condition. Class 4 diseases can be found on the Mississippi Cancer Registry. Mississippi also reports poisonings, including potential poison exposures, drug overdoses and adverse reactions to venomous animals and insects. (MSDH, 2015).

To support this study, various counties within the state of Mississippi have been included in this study and their reporting of asthma occurrences has been identified. These counties' selection was determined based upon their percentages of asthma inpatient visit rates; however, all counties do not report asthma occurrence. According to the report, "Asthma Inpatient Visit Rates (IP) by County Mississippi" submitted by the Mississippi Asthma Hospital Discharge Data System, these counties showed the highest number of asthma inpatient visit rates within the state of Mississippi. All fell between 11.1 – 22.1 percentages, with the lowest of all counties falling between 0.0 – 5.5 percentages. These rates are based per 10,000 individuals. This information is depicted in Table 3. To note, all hospitals do not report.

Table 3: Asthma Reporting of Discharge Rates in Various Counties in Mississippi

Mississippi Counties	Does County Report? Y/N	Mandated Reporting Y/N	Systematic Reporting Y/N	Asthma Discharge Rate for Blacks	Asthma Discharge Rate for Whites	Total Discharge Rate
Adams	N	N	N	28.3	7.5	19.4
Claiborne	N	N	N	12.1	7.9	11.4
Hinds	N	N	N	16.3	6.6	13.2
Issaquena	N	N	N	8.2	10.1	9.0
Jasper	N	N	N	7.8	15.0	12.4
Jones	N	N	N	12.4	28.1	16.8
Lawrence	N	N	N	36.6	31.2	31.2
Leake	N	N	N	23.8	9.2	15.9
Monroe	N	N	N	20.5	14.2	16.1
Montgomery	N	N	N	61.7	13.2	35.2
Newton	N	N	N	21.5	8.2	13.1
Prentiss	N	N	N	6.7	9.7	9.1
Scott	N	N	N	23.3	13.2	17.4
Sunflower	N	N	N	30.2	23.0	28.5
Yalobusha	N	N	N	15.5	12.1	13.3
Yazoo	N	N	N	23.4	14.7	19.3

This study puts forth the more effective policies should be created and implemented to address the asthma disparity presented in this study. To support this assertion, the author has

included a brief examination of three (3) that can be broadly applied to address asthma. The author acknowledges that these policies have successfully addressed various issues, such as equality, discrimination, and smoking cessation, however, they have not specifically addressed the asthma issue investigated in this study.

Examination of Current Public Policies

Executive Order 12898

In 1994, former U.S. President William J. Clinton (Bill) issued *Executive Order 12898-Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. Section 1-1 Implementation establishes the Agency Responsibilities to be:

To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations, and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and Commonwealth of the Mariana Islands (Executive Order 12898, 1994; Council on Environmental Quality 1997: 25).

Examination of Executive Order 12898

Essentially, *Executive Order 12898* was created to address disproportionate impacts in minority and low-income communities. This legislation was embraced by the Environmental Justice Movement (EJM) as a celebrated milestone in their mission to achieve environmental justice and equal environmental policy protection in low-income and minority communities.

In examining this policy, we found neither the term “asthma” was mentioned in this Order. As written; however, the Order generally refers to addressing inequities in minority communities in Section 1-102(b) stating, “The Working Group shall: (1) provide guidance to Federal agencies on criteria for identifying disproportionately high and adverse human health or environmental effects on minority populations and low-income populations” (Executive Order 12898, 1994).

The Clean Air Act of 1970

The Clean Air Act of 1970 (CAA) is the law that defines EPA's responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer. As of this writing, the EPA has celebrated the 40th anniversary of the Clean Air Act. The last major change in the law, *The Clean Air Act Amendments of 1990*, was enacted by Congress in 1990. During the study, this law was referred to several times in interviews as well as in responses to the survey instrument.

The purposes of this law is to **1)** to protect public health and welfare from any actual or potential adverse effect which in the Administrator's judgment may reasonably be anticipated to occur from air pollution or from exposures to pollutants in other media, which pollutants originate

as emissions to the ambient air), notwithstanding attainment and maintenance of all national ambient air quality standards, **2)** to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value, **3)** to insure that economic growth will occur in a manner consistent with the preservation of existing clean air resources, **4)** to assure that emissions from any source in any State will not interfere with any portion of the applicable implementation plan to prevent significant deterioration of air quality for any other State, and **5)** to assure that any decision to permit increased air pollution in any area to which this section applies is made only after careful evaluation of all the consequences of such a decision and after adequate procedural opportunities for informed public participation in the decision-making process. (EPA, 2019)

Examination of the Clean Air Act

Although cited from various participants of this study, the Clean Air Act does not specifically address the occurrence of asthma; its focus is air pollution prevention and control. Asthma is not mentioned in this Act; however, insofar as air pollutants and ambient air quality, asthma occurrences can be inferred. According to the EPA, The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, the law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants.

The National Environmental Policy Act of 1969

The National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.] establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment and provides a process for implementing these goals within the federal agencies. The Act also establishes the Council on Environmental Quality (CEQ). The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

Examination of the National Environmental Policy Act of 1969

The purposes of the National Environmental Policy Act of 1969 are 1) to declare a national policy which will encourage productive and enjoyable harmony between man and his environment, 2) to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man, 3) to enrich the understanding of the ecological systems and natural resources important to the Nation, and 4) to establish a Council on Environmental Quality (NEPA, 2008). Comparable the Clean Air Act and the Executive Order 12898, this Act also does not specifically mention asthma or toxic dumps. Consistent with these Acts, the asthma issue can be inferred under broad, general terms. As stated in this Act, “In order to carry out the policy set forth in this Act,” one of its objectives as it relates to this study, is to, “Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences” (NEPA, 2019).

Current Efforts Implemented to Effectively Address Asthma Disparity

In May 2012, the President's Task Force on Environmental Health Risks and Safety Risks to Children released the Coordinated Federal Action Plan to Reduce Racial and Ethnic Asthma Disparities. The goal of the plan is to build on the strength of past and existing federal programs while developing collaborative strategies to plug the knowledge gap with resources that already exist. Low-income and minority asthma sufferers face challenges such as limited access to quality medical care, low levels of health literacy, and inability to afford medication. Additionally, they face higher levels of environmental exposure to allergens and pollutants that exacerbate asthma and lack community level activities to reduce outdoor air pollution.

The action plan, in which EPA is a major partner, focuses on the following four strategies:

- Reduce barriers to the implementation of guidelines-based asthma management
- Enhance capacity to deliver integrated, comprehensive asthma care to children in communities with racial and ethnic asthma disparities
- Improve capacity to identify the children most impacted by asthma disparities
- Accelerate efforts to identify and test interventions that may prevent the onset of asthma among ethnic and racial minority children
- Progress of the action plan will be documented semi-annually and made public at www.epa.gov/childrenstaskforce.

Methodology

The methodology employed for the research is a case study that will utilize a triangulation of qualitative and quantitative data. Statistical analysis will be included to support the findings of this study. The author will also employ fact-fact techniques; such as, interviews, questionnaires, and surveys. This case study and fact-finding measures will be used to examine the disproportionate occurrence of asthma and the socio-economic impact on the state of Mississippi.

Data Collection and Participant Criteria for Survey Inclusion

Community members and governmental officials were chosen for this case study research, wherein which one hundred (100) surveys were submitted. Participants were invited to participate based upon their knowledge of the occurrence of asthma in the state of Mississippi and public policies created to address the asthma disparity. Participants categorized as Community Members were also invited to participate based upon the community in the state of Mississippi in which they reside.

Participants were questioned in regards to their knowledge of the racial makeup of their communities. The question was structured to include region of employment acknowledging that all advocates and government officials work and reside in different communities. In Table 6, the question of poverty is addressed.

Table 4: Are the residents of your community and/or region of employment predominately minorities?

Category	+N	Yes	No	*N/A
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Governmental Officials	25	23	2	0
Community Members	75	67		8

+N=Number of Surveys

*N/A= The participants chose not to answer the question.

Table 5: Have you or are you aware of anyone in your family and/or community ever being diagnosed with asthma?*

Category	+N	Yes	No	*N/A
Governmental Officials	25	7	0	0
Community Members	75	62	13	0

+N=Number of Surveys

*N/A= The participants chose not to answer the question.

**Participants were asked if they or anyone in their family had asthma.

Table 6: In the region, district, etc. where you live, are the residents predominately above the poverty line? ¹

Category	+N	Yes	No	*N/A
Governmental Officials	25	21	4	0
Community Members	75	42	0	33

+N=Number of Surveys

*N/A= The participants chose not to answer the question.

Essentially, governmental officials are considered to have significant impact in policy creation and implementation; therefore, the following questions were presented only to government officials and the results are shown in Table 11.

Table 7: Based upon your job description, do you feel you have sufficient power to affect positive outcome of public policies?

Category	+N	Yes	No	*N/A
Governmental Officials	25	18	5	2

+N=Number of Surveys

*Participants chose not to answer the question.

Table 8: Research and statistics support assertions that inequalities exist in environmental policies and protection that have a greater impact on blacks and other minorities than on non-minorities. What is your reaction regarding this statement?

Category	+N	Strongly Agree	Agree	Disagree	Strongly Disagree	N/A
Governmental Officials	25	11	14			

+N=Number of Surveys

*N/A= The participants chose not to answer the question.

Significance of the Study

This research seeks to identify those variables that best identify that there exists a disproportionate occurrence of asthma within disadvantaged communities within the state of Mississippi and this occurrence negatively impacts the socio-economic status of state of Mississippi. This researcher seeks to identify those variables that best explain the higher-than-average childhood asthma prevalence in low-income minority communities and to what degree environmental toxic pollutants are contributors. Moreover, what level of effectiveness are the current policies in addressing this enigma?

While a great deal of research has been conducted on risk factors associated with asthma, all of this data is not necessary to begin evaluating asthma from a perspective of policy formation and implementation to obviate disparity. The most basic information needed that is readily available to public health agencies is age, race, location of residence, socio-economic status, and mortality. Therefore, these variables will comprise the core determinants of an evaluation of asthma as an environmental justice problem that disproportionately affect disadvantaged communities.² The EPA has divided the United States into ten regions. Accordingly, this research was conducted in the state of Mississippi: Region 4.

Based upon this information, this study seeks to present policy recommendations that will obviate this asthma disparity and positively impact the socio-economic status of the state of Mississippi.

Limitations of the Study

Various organizations within the state of Mississippi collect and analyze information about asthma occurrences. Methods of reporting from these different sources of data do not always match. Different results can often be attributed to differences of methodology, timeframe, interpretation, or the ambiguities inherent to varied reporting practices. Therefore, this researcher posits that the possible occurrences of Type I and Type II errors exist and these errors can negatively impact the accuracy of the findings of this study.

Lastly, limitations may be encountered in gathering information that accurately reflects the number of asthma cases may not be obtained with any significant level of ease. Individuals may be reluctant to provide the contents of their medical records, medical officials are not legally authorized to disseminate individuals' medical condition or any information contained in their medical records.

Dependent Variable

The dependent variable in this study is the disproportionate occurrence of asthma among disadvantaged communities and socio-economic impact within the state of Mississippi.

Independent Variable

The independent variable in this study is the socio-economic status of individuals who have been diagnosed with asthma within the state of Mississippi.

Conclusion/Recommendations

Currently in the state of Mississippi, asthma has no mandate to consistently and systematically report cases of asthma. The Mississippi State Health Department developed an Asthma Program to address the asthma issue within the state of Mississippi. With this initiative, a partnership formed with the Mississippi Asthma Coalition to realize the programs goals of this initiative, although some success was experienced, Asthma continues to be a problem resulting in a negative impact on the socio-economic welfare of the state of Mississippi. Through this research, the researchers seek to add to the contributions of this study and raise the awareness of the necessity for mandating reporting of asthma cases in a consistent and systematic form that will also serve to directly and positively affect the socio-economic conditions of the state of Mississippi.

The policy recommendations put forth in this study are:

- Mandate consistent reporting of each occurrence of asthma for each Mississippi County Health Department
- Consistently communicate with grassroot organizations who are coalitions created to effectively address asthma disparities
- Monitor the Mississippi State Department of Health Asthma Information and zip codes that are more heavily impacted
- Provide asthma education mandates of asthma patients

Abbreviations

CAA	Clean Air Act
CDC	Centers for Disease Control and Prevention
CEQ	Council on Environmental Quality
ED	Emergency Department
EJM	Environmental Justice Movement
EPA	Environmental Protection Agency
GIP	Guidelines Implementation Panel
IP	Asthma Inpatient Visit Rates
MAC	Mississippi Asthma Coalition
MSDH	Mississippi Department of Health
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
PACE	Physician Asthma Care Education

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